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RESPONSE UNDER 37 C.F.R. § 1.111

Examiner maintains the position that the Declaration is unconvincing. In particular, the Examiner states that the 5% difference in residual film rate being significant to one of ordinary skill in the art in view of the prior art reference, US 4,719,167, which exemplifies a 2% difference in fractional film thickness, is not persuasive in that "there is no correlation which would indicate that a 2% difference in fractional film thickness as evaluated by the prior art is related to residual film rate as claimed."

In regard to the evidence relating to profiles A and B, the Examiner notes Applicants' definitions for profile A and profile B, and states that it is unclear why the comparative examples are labeled as profile B, when the angles are clearly within the range of profile A. In particular, the Examiner questions how the definitions of profile A and profile B both contain the point of 85 degrees.

Applicants respectfully submit that the present invention is not anticipated by or obvious over the disclosures of Suwa and request that the Examiner reconsider and withdraw this rejection in view of the following remarks.

Relationship between the Residual Film Rate and the Fractional Film Thickness

In regard to the Examiner's statements regarding the residual film rate discussed in the Declaration versus the fractional film thickness remaining percentage taught by US 4,719,167, in the present specification, the processed resist films where examined for thickness and thereby the residual film rate was

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determined. As disclosed in Applicants' specification, page 60, lines 10-12, the residual film rate is determined by the equation:

[(film thickness after processing/film thickness before processing) X 100].

The fractional film thickness defined in US 4,719,167 is the percentage of the ratio of the unexposed area before and after developing (processing) and it is the same as that indicated in the present specification (see page 60, lines 10 to 12 in the present specification). Therefore, the fractional film thickness in US 4,719,167 has a direct correlation to the residual film rate in the present specification.

Additionally, Applicants respectfully submit that one of ordinary skill in the art would consider the 5% difference as described in the present application to be an unexpected and significant difference. US 4,719,167 describes that a 2% difference is significant. Therefore, the 5% difference as described in the present application, being much greater, is considered to be a significant difference.

Effect of Difference in Profile

Regarding the definition of profiles A and B, as noted by the Examiner, both the definitions of profile A and profile B should not contain the point of 85 degrees. The textual description of the definition of profile A contained a clerical error. The definitions of profile A and profile B are as follows:

profile A: From not smaller than 86 degrees to not greater than 90 degrees;

And

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profile B: Not greater than 85 degrees.

Preferably the inventive profile is from 88 degrees to 89 degrees.

Applicants respectfully submit that the profile definitions above are correct.

Additionally, Applicants are considering the submission of a corrected §132 Declaration.

Effect of Difference in Profile

Even a small difference in profile is important because it affects the control over the width of lines on stepped board (see Applicants' Response filed on February 10, 2003) and the dimensional shift after etching. Both of these two factors are well known to one skilled in the art.

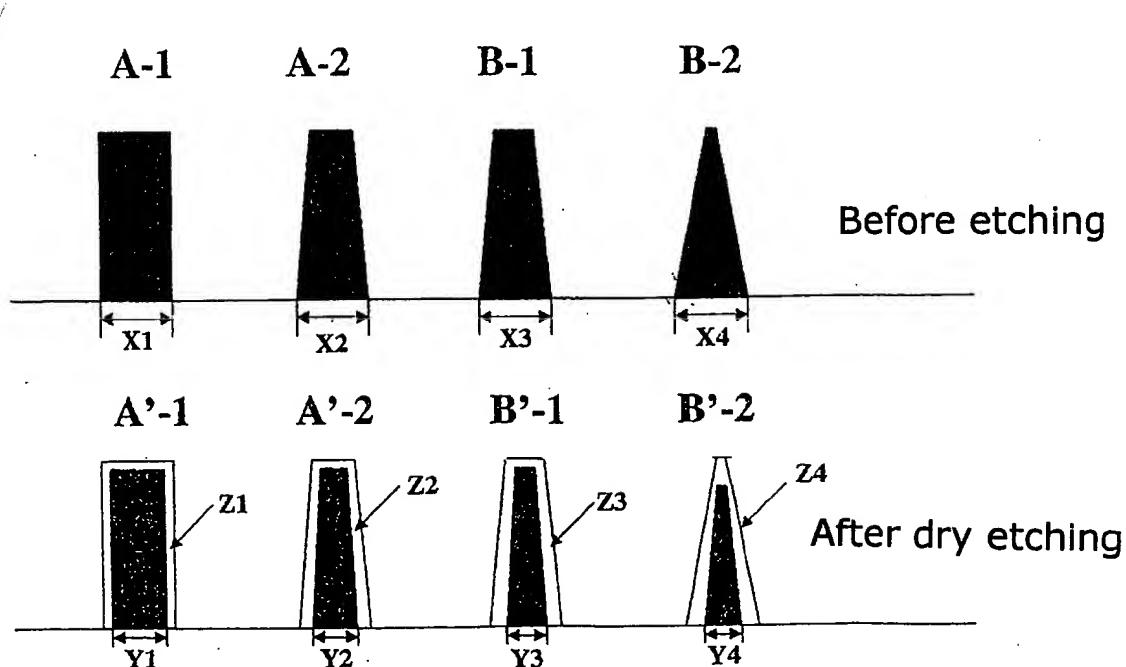
The dimensional shift after etching is described in connection with Figure 1 below. Supposing that lines are formed by four kinds of resists (A-1, A-2, B-1, B-2) with the same width. As seen in Figure 1, A-1 has the best profile, while B-2 has the poorest profile (before etching). Supposing that the lines have the same width, the equation $X_1 = X_2 = X_3 = X_4$ is established.

The results of dry etching of these four kinds of resists having different profiles are shown in the lower part (A'-1, A'-2, B'-1, B'-2) of Figure 1. These resins are isotropically etched at the same rate regardless of profile. Therefore, the areas on these resins which are dry-etched (area on the resins which are damaged due to etching and removed away) are the same. In other words, the equation $Z_1 = Z_2 = Z_3 = Z_4$ is established.

Paying attention to the width of line at the bottom of the resins, the better the profile is, the smaller is the change of line width. Thus, the poorer the profile is, the greater is the change of line width. When etching causes a great change of line width, the desired work dimension cannot be obtained.

In other words, a resist having a poor profile shows a great change of line width when etched. In short, the bottom of the resin is subject to change of line width by etching. It is well known to one skilled in the art that such a small difference in profile relates to the controllability of line width after etching.

Fig. 1



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Accordingly, the difference in profile (3° (Example b - Comparative Example b') and 4° (Example a and Comparative Example a'), as calculated in terms of the angle between the substrate and the sidewall, in the submitted §132 Declaration is an extremely great significant difference and thus substantiates unexpectedly superior results.

As it is seen in Figure 1 above, supposing that the equations $X_1 = X_2 = X_3 = X_4$ and $Z_1 = Z_2 = Z_3 = Z_4$ are established, the relationships $Y_1 > Y_2 > Y_3 > Y_4$ and $X_1 \cdot Y_1 < X_2 \cdot Y_2 < X_3 \cdot Y_3 < X_4 \cdot Y_4$ are established.

For the above reasons, it is respectfully submitted that the subject matter of claims 1-15 is neither taught by nor made obvious from the disclosures of Suwa and it is requested that the rejection under 35 U.S.C. §103(a) be reconsidered and withdrawn.

Conclusion

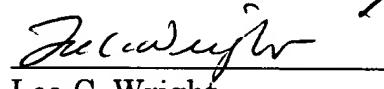
In view of the above, Applicants respectfully submit that their claimed invention is allowable and ask that the rejection under 35 U.S.C. §103 be reconsidered and withdrawn. Applicants respectfully submit that this case is in condition for allowance and allowance is respectfully solicited.

If any points remain at issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the local exchange number listed below.

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Applicants hereby petition for any extension of time which may be required to maintain the pendency of this case. The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,


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WASHINGTON OFFICE
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